Patent claims

1. An apparatus for machining a metallic workpiece in strip or plate form, in particular for removing the oxide layer from cut surfaces and/or cut edges of the workpiece, characterized in that there is a revolving conveyor device (2) provided with at least one brush (3), the conveyor device (2) guiding the at least one brush (3) at least approximately linearly past the region of the workpiece (1) that is to be machined.

2. The apparatus as claimed in claim 1, characterized in that the conveyor device (2) is arranged in a standing position, so that the at least one brush (3) runs substantially vertically in the region of the workpiece (1), or in a lying position, so that the at least one brush (3) runs substantially horizontally in the region of the workpiece (1).

3. The apparatus as claimed in claim 1 or 2, characterized in that there are two conveyor devices (2), between which the workpiece (1) can be guided obliquely or transversely with respect to the direction of rotation of the conveyor device (2), in such a manner that each conveyor device (2) machines one of the two main surfaces (1c) of the workpiece (1) by means of the associated brushes (3).

4. The apparatus as claimed in claim 3, characterized in that the direction of rotation of the conveyor devices (2) is selected in such a manner that the brushes (3) of the two conveyor devices (2) can be guided past the main surfaces (1c) of the workpiece (1) in the same direction.

5. The apparatus as claimed in claim 2, 3 or 4, characterized in that the direction of rotation of the conveyor device (2) arranged in a standing position is selected in such a manner that the at least one brush (3) can be guided past the workpiece (1) in the direction of a base plate (9), or from the top downward.

6. The apparatus as claimed in claim 2, 3 or 4, characterized in that the direction of rotation of the conveyor device (2) arranged in a lying position is selected in such a manner that the at least one brush (3) can be guided along the workpiece (1) in the direction of a delimiting plate which guides the workpiece (1) at one end side.

7. The apparatus as claimed in one of claims 1 to 6, characterized in that there are four conveyor devices (2), with in each case two oppositely rotating conveyor devices (2) machining the workpiece (1) on one main surface (1c).

8. The apparatus as claimed in one of claims 1 to 7, characterized in that the conveyor devices (2) are arranged slightly offset, preferably by 10 to 100 mm, with respect to one another in the direction in which the workpiece (1) passes through.

9. The apparatus as claimed in claim 7 or 8, characterized in that in an arrangement of four conveyor devices (2), the direction of rotation of the first conveyor device (2) and the fourth conveyor device (2), as seen in the direction in which the workpiece (1) passes through, is selected in such a manner that the brushes (3) can be guided past the workpiece (1) in the direction of the base plate (9) or the delimiting plate.

10. The apparatus as claimed in one of claims 1 to 9, characterized in that the at least one conveyor device (2) has a plurality of brushes (3) arranged at a distance from one another.

11. The apparatus as claimed in one of claims 1 to 10, characterized in that there is a guide passage (4), which can be set to the thickness of the workpiece (1) and by means of which the workpiece (1) can be displaced with guidance transversely with respect to the direction of rotation of the at least one guide device (2).

12. The apparatus as claimed in one of claims 3 to 11, characterized in that the conveyor devices (2) can be displaced or adjusted with respect to one another, preferably in order to correct for the wear to the at least one brush (3).

13. The apparatus as claimed in one of claims 1 to 12, characterized in that the bristles (12) of the brush (3) have a wavy and/or twisted profile.

14. The apparatus as claimed in one of claims 1 to 13, characterized in that the bristles (12) of the brush (3) are formed as intertwined bristles and/or abrasive bristles.

15. The apparatus as claimed in one of claims 1 to 14, characterized in that the bristles (12) of the brush (3) are inclined by up to 45°, preferably by 15°, in the direction of rotation.

16. The apparatus as claimed in claim 13, 14 or 15, characterized in that the brush (3) is provided with supporting bristles (20) for supporting and stabilizing the bristles (12).

17. The apparatus as claimed in claim 14 or 15, characterized in that in each case a bundle (120) of the bristles (12) is surrounded by a stabilizing and supporting sheath (21).

18. The apparatus as claimed in one of claims 1 to 17, characterized in that the brush (3) or the bristles (12) of the brush (3) is (are) adhesively bonded, molded, screwed, stamped or welded to the respective conveyor device (2).

19. The apparatus as claimed in one of claims 1 to 18, characterized in that the rotational speed of the brush (3) is 5 to 30 m/sec, preferably 15 to 16 m/sec.

20. The apparatus as claimed in one of claims 1 to 19, characterized in that each conveyor device (2) has an independent drive, preferably an electric motor (10).

21. The apparatus as claimed in one of claims 1 to 20, characterized in that the conveyor device (2) is provided with a V-belt (13) or a toothed belt or a flat belt with studs, or a chain.

22. The apparatus as claimed in one of claims 1 to 21, characterized in that the conveyor device (2) is designed with a triple V-belt (13a, 13b, 13c), the middle V-belt (13a) being intended to accommodate the brushes (3).

23. The apparatus as claimed in claim 21 or 22, characterized in that the V-belt (13) is formed from rubber and/or plastic or synthetic rubber, preferably neoprene.

24. The apparatus as claimed in claim 21, 22 or 23, characterized in that a PU covering layer (14) is applied to the V-belt (13), and a carrier (15), which is preferably formed from rubber or plastic, for the brush (3) or the bristles (12) is welded onto the PU covering layer (14).

25. The apparatus as claimed in claim 21, 22 or 23, characterized in that a carrier (15), which is preferably formed from rubber or plastic, for the brush (3) or the bristles (12) is screwed, riveted, adhesively bonded, welded or clipped onto the V-belt (13).

26. The apparatus as claimed in claim 25, characterized in that the V-belt (13), on its top side intended for connection to the carrier (15), has elevations or protuberances (17) which guide or support the carrier.

27. The apparatus as claimed in claim 24, 25 or 26, characterized in that the bristles (12) are shot into the carrier (15) in bundles (120).

28. The apparatus as claimed in one of claims 24 to 27, characterized in that the carrier (15), transversely with respect to the direction of rotation of the conveyor device (2), has slots (16) or is formed from individual segments (15b), the segments (15b) or the pieces (15a) formed by the slots (16) having a length of from 10 to 40 mm, preferably 18 mm.

29. The apparatus as claimed in claim 28, characterized in that the segments (15b) each have a groove (18) at one end and a tongue (19) at the other end, by means of which the segments (15b) can be connected to one another.

30. The apparatus as claimed in claim 28 or 29, characterized in that in each case two to four, preferably three, adjacent segments (15b) or pieces (15a) are provided with bristles (12) and together form a brush (3).

31. The apparatus as claimed in claim 30, characterized in that one to three, preferably two, bristle-free segments (15b) or pieces (15a) are arranged between the brushes (3) of a V-belt (13).

32. The apparatus as claimed in claim 28 or 29, characterized in that the pieces (15a) or segments (15b) are arranged at a distance from one another or in free-standing form, with the distance being 3 to 20 mm, preferably 6 to 10 mm.

33. The apparatus as claimed in one of claims 1 to 32, characterized in that a resistance element (23) is arranged downstream of a diversion point (22) of the conveyor

device (2), as seen in the direction of rotation, before the brush (3) or the bristles (12) come(s) back into contact with the metallic workpiece (1) in strip or plate form.

34. The apparatus as claimed in claim 33, characterized in that the resistance element (23) is arranged in the region in which the brush (3) or its bristles (12) leave(s) the circular path produced by the diversion point (22) of the conveyor device (2) and merge(s) into a linear or rectilinear movement.

35. The apparatus as claimed in claim 33 or 34, characterized in that the resistance element (23) mechanically, preferably as a steel roll, or magnetically prevents the bristles (12) from yielding in the direction of rotation.

36. The apparatus as claimed in claim 35, characterized in that the steel roll (23) can be introduced into the path of the brush (3) or bristles (12) in such a manner that the tips of the bristles (12) butt against it.

37. A V-belt for use in the apparatus as claimed in one of claims 1 to 36, characterized by bristles (12) which are adhesively bonded, molded, screwed, stamped or welded onto a top side, either directly or via a carrier.

38. A method for machining a metallic workpiece in strip or plate form, in particular for removing the oxide layer from cut surfaces and/or cut edges of the workpiece, characterized in that a rotating conveyor device (2) which is provided with at least one brush (3) is operated in such a manner that the at least one brush (3) runs at least approximately linearly in a region corresponding to the dimensions of the workpiece (1), and in that the workpiece (1) is guided past obliquely or transversely with respect to the direction of rotation of the conveyor device (2), making contact with the brush (3).